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the records in the *Monthly Notices* of March last. Anyone who is familiar with the ordinary type of aurora with streamers cannot fail to recognise in most of the accounts contained in that number of the *Notices*, and the drawing by Sir W. J. Herschel on p. 334, a very good description of an auroral display. No doubt Sir W. J. Herschel and others saw the zodiacal light as well, and it was merely a coincidence that the two phenomena were superposed.

Observations of the ray seen here were made at several other places, and one made at York by Mr. J. E. Clark was sufficiently exact for him to use in conjunction with those at Sunderland and Cambridge to calculate the height. He finds that at 8.30 P.M. it was 200 miles above Galway Bay at the top, and 40 miles or less at its base, above a point a quarter of the distance from Louth to Drogheda. With these positions it could not be a simple ray; but if we assume that it was one, and that there was error in the descriptions, and take the mean position, it would still leave the middle of the ray at an altitude of about 120 miles, while the height of the apex would be lowered, and that of the base increased.

Observations of Minor Planets at Windsor, New South Wales.

By John Tebbutt.

The accompanying observations of minor planets during 1896 were made with the filar micrometer on the 8-inch equatorial and in an illuminated field. The differential observations are corrected for refraction, and a small error in the perpendicularity of the micrometer threads. The distance threads of the micrometer are so fine and the planet *Undina* was so faint that considerable difficulty was experienced in this case. On comparing the resulting places of *Calliope* with an approximate ephemeris kindly furnished by Dr. Bauschinger, of Berlin, I found there was a fair agreement except in the case of September 21, 22, 23, when the places depend on star No. 1. The only authority I could find for this star was Arg.-Oeltzen, in which catalogue it is given as No. 300. I was led to suspect that the tabular N.P.D. of this star was about a minute too great, and I accordingly made six comparisons of the star with the clock star β *Ceti* on October 16, the result of which completely confirmed my suspicions. I have therefore adopted the mean place as derived from the equatorial comparisons. *Sappho* was brighter than I expected to find it. The opposition magnitude given in the *Berliner Astronomisches Jahrbuch* for 1898 is 9·3, whereas I regarded it as fully equal to 8·5. I will add that the quantities $p\Delta$ have been computed with an assumed value of the solar parallax $=8''\cdot85$.

Date.	Windsor Mean Time.	Planet−Star. Δ R.A.	Planet−Star. Δ N.P.D.	No. of Comps.	Planets App. R.A.	Log. $p\Delta$	Planet's App. N.P.D.	Log. $p\Delta$.	Reduction to App. Place R.A.	Reduction to App. Place N.P.D.	Comp. Star.
					⑥ *Hebe.*						
1896.	h m s	m s	′ ″		h m s		° ′ ″		s	″	
May 17	9 52 22	+0 24·34	−10 14·1	20	17 0 37·86	9·585*n*	90 34 56·9	0·683	+2·91	+14·5	1
18	9 56 9	−0 25·22	−13 26·3	20	16 59 48·31	9·571*n*	90 31 44·6	0·684	+2·92	+14·4	1
30	9 15 17	+1 7·79	+18 24·3	15	16 48 55·24	9·541*n*	90 7 15·5	0·687	+3·11	+13·5	2
June 1	8 42 31	−0 47·24	+16 59·9	7	16 47 0·23	9·581*n*	90 5 50·8	0·687	+3·13	+13·2	2
5	9 16 4	−4 43·59	+16 42·2	10	16 43 3·93	9·475*n*	90 5 32·6	0·687	+3·18	+12·7	2
5	9 16 4	−1 0·48	+11 35·9	10	16 43 3·95	9·475*n*	90 5 30·5	0·687	+3·17	+12·9	3
10	9 39 25	−1 20·68	+ 1 1·5	10	16 38 11·29	9·324*n*	90 9 58·5	0·686	+3·22	+12·5	4
10	9 39 25	−2 58·14	+ 0 21·7	10	16 38 11·09	9·324*n*	90 9 59·6	0·686	+3·22	+12·4	5
11	8 26 43	−2 15·42	+ 2 30·4	15	16 37 16·56	9·521*n*	90 11 27·3	0·686	+3·23	+12·4	4
11	8 26 43	−3 52·81	+ 1 50·6	15	16 37 16·43	9·521*n*	90 11 28·4	0·686	+3·23	+12·3	5
13	8 40 54	+3 17·75	+ 2 58·7	15	16 35 22·33	9·465*n*	90 15 11·5	0·685	+3·23	+12·4	6
14	8 35 5	+2 21·91	+ 5 10·7	15	16 34 26·50	9·467*n*	90 17 23·4	0·685	+3·24	+12·3	6
15	8 53 51	+1 25·65	+ 7 37·6	15	16 33 30·24	9·400*n*	90 19 50·2	0·684	+3·24	+12·2	6
16	7 40 6	+0 33·70	+10 6·3	20	16 32 38·30	9·563*n*	90 22 18·8	0·685	+3·25	+12·1	6
					⑪ *Parthenope.*						
Apr. 11	9 55 2	+4 4·40	+12 20·5	12	14 47 58·97	9·599*n*	98 16 53·3	0·621	+2·52	+18·7	1
11	9 55 2	+0 36·39	...	12	14 47 59·27	9·599*n*	...	...	+2·52	...	2
12	9 56 49	+3 20·26	+ 7 20·6	15	14 47 14·85	9·590*n*	98 11 53·4	0·620	+2·54	+18·7	1
12	9 56 49	−0 7·71	...	15	14 47 15·19	9·590*n*	...	...	+2·54	...	2

Date.	Windsor Mean Time.	Planet – Star. Δ R.A.	Planet – Star. Δ N.P.D.	No. of Comps.	Planet's App. R.A.	Log. *p*Δ.	Planet's App. N.P.D.	Log. *p*Δ.	Reduction to App. Place R.A.	Reduction to App. Place N.P.D.	Comp. Star.
1896.	h m s	m s	′ ″		h m s		° ′ ″		s	″	
May 6	9 16 56	–1 45·12	...	10	14 26 9·099	9·425*n*	...	...	+2·80	...	7
7	9 21 34	+1 59·05	–12 4·9	10	14 25 14·33	9·395*n*	96 14 13·8	0·618	+2·80	+18·6	9
7	9 21 34	–2 39·92	...	10	14 25 14·29	9·395*n*	...	...	+2·80	...	7
8	8 53 40	+1 6·05	–15 47·3	10	14 24 21·34	9·463*n*	96 10 31·4	0·623	+2·81	+18·6	9
8	8 53 40	–3 33·06	...	10	14 24 21·16	9·463*n*	...	...	+2·81	...	7
					㉒ *Calliope.*						
Sept. 21	9 40 17	–0 24·64	– 6 7·9	15	0 31 10·37	9·539*n*	108 15 31·2	0·463	+4·27	–28·1	1
22	9 19 47	–1 15·57	– 2 35·1	15	0 30 19·45	9·570*n*	108 19 4·0	0·478	+4·28	–28·1	1
23	9 32 20	–2 8·12	+ 0 52·4	10	0 29 26·90	9·536*n*	108 22 31·6	0·459	+4·28	–28·0	1
26	8 53 37	–0 4·05	–15 40·6	5	0 26 50·88	9·583*n*	108 31 33·9	0·483	+4·33	–27·5	2
27	8 49 11	–0 56·99	–13 1·7	10	0 25 57·95	9·583*n*	108 34 12·9	0·482	+4·34	–27·4	2
27	8 49 11	–1 27·54	...	10	0 25 57·97	9·583*n*	...	...	+4·33	...	3
28	9 0 45	–1 50·41	–10 31·2	13	0 25 4·50	9·552*n*	108 36 40·5	0·463	+4·34	–27·3	2
28	9 0 45	–2 21·02	...	13	0 25 4·50	9·552*n*	...	...	+4·34	...	3
30	8 50 27	–3 35·97	+ 6 17·9	10	0 23 18·99	9·553*n*	108 40 56·9	0·462	+4·35	–27·2	2
30	8 50 27	–4 6·46	...	10	0 23 19·07	9·553*n*	...	...	+4·35	...	3
Oct. 2	9 35 35	–5 23·05	– 2 52·0	6	0 21 31·92	9·412*n*	108 44 23·0	0·408	+4·37	–27·0	2
2	9 35 35	–5 53·56	...	6	0 21 31·99	9·412*n*	...	...	+4·37	...	3

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Date.	Windsor Mean Time.	Planet—Star.		No. of Comps.	Planet's App. R.A.	Log. $p\Delta$.	Planet's App. N.P.D.	Log. $p\Delta$.	Reduction to App. Place		Comp. Star.
		Δ R.A.	Δ N.P.D.						R.A.	N.P.D.	
					(61) *Danaë.*						
1896.	h m s	m s	′ ″		h m s		° ′ ″		s	″	
Aug. 11	10 32 9	+5 41·60	+19 28·0	10	22 14 45·85	9·469*n*	105 56 4·1	0·481	+4·12	−18·5	1
12	9 53 32	+4 41·52	+16 47·9	10	22 13 45·78	9·548*n*	105 53 24·0	0·508	+4·13	−18·5	1
18	11 16 22	−1 44·09	− 0 43·4	10	22 7 20·24	9·131*n*	105 35 52·4	0·444	+4·20	−18·8	1
19	10 31 34	−2 46·63	− 3 42·7	10	22 6 17·71	9·339*n*	105 32 53·1	0·463	+4·21	−18·8	1
24	9 2 36	−1 3·83	+17 22·4	15	22 0 57·66	9·528*n*	105 16 53·7	0·511	+4·25	−18·3	2
26	9 47 23	−3 14·07	+10 20·6	10	21 58 47·43	9·374*n*	105 9 51·9	0·476	+4·26	−18·3	2
26	9 47 23	−0 6·75	+13 9·1	10	21 58 47·66	9·374*n*	105 9 51·5	0·476	+4·26	−18·0	3
29	9 0 2	−6 20·95	− 0 22·9	10	21 55 40·57	9·474*n*	104 59 8·4	0·495	+4·28	−18·3	2
29	9 0 2	−3 13·66	+ 2 24·6	10	21 55 40·77	9·474*n*	104 59 7·0	0·495	+4·28	−18·0	3
					(80) *Sappho.*						
Oct. 19	10 47 7	−2 36·40	− 6 56·4	14	1 44 55·59	9·145*n*	75 30 36·3	0·812	+4·40	−28·3	1
20	10 34 17	−3 22·32	+ 5 41·2	10	1 44 9·68	9·196*n*	75 43 13·8	0·810	+4·41	−28·4	1
20	10 34 17	−1 35·17	− 1 55·0	10	1 44 9·27	9·196*n*	75 43 12·7	0·810	+4·40	−28·4	2
21	10 0 23	−4 7·38	...	10	1 43 24·62	9·336*n*	...	...	+4·41	...	1
21	10 0 23	−2 20·22	+10 32·9	10	1 43 24·23	9·336*n*	75 55 40·6	0·802	+4·41	−28·4	2
					(92) *Undina.*						
Oct. 5	8 57 35	+2 0·86	− 4 10·2	16	0 47 0·14	9·532*n*	101 7 37·9	0·572	+4·27	−28·0	1
9	9 1 17	−0 56·27	+10 57·6	16	0 44 3·03	9·481*n*	101 22 46·0	0·558	+4·29	−27·7	1
10	9 50 5	−1 41·33	+14 24·4	14	0 43 17·98	9·305*n*	101 26 12·8	0·536	+4·30	−27·7	1
11	10 22 11	−2 25·45	+17 39·6	9	0 42 33·86	9·100*n*	101 29 28·1	0·525	+4·30	−27·6	1

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(140) *Siwa.*

Date.	Windsor Mean Time.	Planet – Star. Δ R.A.	Planet – Star. Δ N.P.D.	No. of Comps.	Planet's App. R.A.	Log. $p\Delta$.	Planet's App. N.P.D.	Log. $p\Delta$.	Reduction to App. Place R.A.	Reduction to App. Place N.P.D.	Comp. Star.
1896.	h m s	m s	′ ″		h m s		° ′ ″		s	″	
July 25	9 42 0	−1 36·31	−14 36·6	10	19 50 52·11	9·405*n*	112 17 8·4	0·311	+4·30	−4·6	1
25	9 42 0	+2 36·54	−12 20·5	10	19 50 52·03	9·405*n*	112 17 8·7	0·311	+4·30	−4·7	2
26	9 46 41	−2 24·44	−10 26·4	8	19 50 3·99	9·370*n*	112 21 18·6	0·298	+4·31	−4·6	1
26	9 46 41	−3 24·73	− 8 10·4	8	19 50 3·85	9·370*n*	112 21 18·8	0·298	+4·31	−4·7	2
27	8 45 40	−3 9·53	− 6 30·8	10	19 49 18·91	9·537*n*	112 25 14·2	0·373	+4·32	−4·6	1
27	8 45 40	−4 9·86	− 4 14·8	10	19 49 18·73	9·537*n*	112 25 14·4	0·373	+4·32	−4·7	2
28	8 22 14	−3 55·39	− 2 33·5	10	18 48 33·06	9·576*n*	112 29 11·5	0·399	+4·33	−4·6	1
28	8 22 14	−4 55·76	− 0 16·9	10	19 48 32·84	9·576*n*	112 29 12·3	0·399	+4·33	−4·7	2
29	8 57 3	−4 42·57	+ 1 30·7	8	19 47 45·89	9·486*n*	112 33 15·7	0·339	+4·34	−4·6	1
29	8 57 3	−5 42·88	+ 3 46·4	8	19 47 45·72	9·486*n*	112 33 15·6	0·339	+4·33	−4·7	2
Aug. 1	8 34 9	+1 25·12	−17 49·1	10	19 45 33·54	9·519*n*	112 44 35·1	0·347	+4·36	−3·6	3
1	8 34 9	−4 58·73	…	10	19 45 33·39	9·510*n*	…	…	+4·37	…	4
2	8 1 13	+0 43·87	−14 16·1	10	19 44 52·30	9·572*n*	112 48 8·1	0·389	+4·37	−3·6	3
2	8 1 13	−5 39·98	…	10	19 44 52·14	9·572*n*	…	…	+4·37	…	4
3	9 12 15	…	−10 33·6	7	…	…	112 51 50·6	0·279	…	−3·6	3
3	9 12 15	−6 23·33	− 7 24·5	7	19 44 8·80	9·361*n*	112 51 51·2	0·279	+4·38	−4·3	4
4	8 39 15	−0 38·88	− 7 11·0	8	19 43 29·55	9·459*n*	112 55 13·2	0·315	+4·37	−3·6	3
4	8 39 15	−7 2·62	− 4 2·0	8	19 43 29·51	9·459*n*	112 55 13·7	0·315	+4·38	−4·3	4
5	8 21 57	−1 16·91	− 3 52·4	10	19 42 51·53	9·495*n*	112 58 31·8	0·332	+4·38	−3·6	3

Adopted Mean Places of the Comparison Stars for 1896·0.

Star.	R.A.	N.P.D.	Authorities.
			⑥ *Hebe.*
	h m s	° ′ ″	
1	17 0 10·61	90 44 56·5	Lamont 5,468, Göttingen 4,178, Glasgow 1870, 4,204, Greenwich 1880, 2,665, Radcliffe 1890, 4,446.
2	16 47 44·34	89 48 37·7	Lamont 5,371, Göttingen 4,108, Yarnall$_3$ 7,114, Schjellerup 6,007, Glasgow 1870, 4,162, Glasgow 1890, 1,458, Cincinnati 1,374, Radcliffe 1890, 4,385.
3	16 44 1·26	89 53 41·7	Lamont 5,337, Göttingen 4,085, Glasgow 1870, 4,143.
4	16 39 28·75	90 8 44·5	Lamont 5,294, Göttingen 4,052, Radcliffe 1890, 4,356.
5	16 41 6·01	90 9 25·5	Radcliffe 1890, 4,364.
6	16 32 1·35	90 12 0·4	Göttingen 4,011, Radcliffe 1890, 4,315.
			⑪ *Parthenope.*
1	14 43 52·05	98 4 14·1	Radcliffe 1890, 3,831.
2	14 47 20·36	98 16 8·4	Lalande 27,076.
3	14 48 55·52	97 57 51·1	Radcliffe 1890, 3,848.
4	14 38 42·82	97 48 46·3	Radcliffe 1890, 3,807.
5	14 40 41·78	97 21 30·0	Radcliffe 1890, 3,819.
6	14 33 5·65	96 42 37·0	Radcliffe 1890, 3,786.
7	14 27 51·41	96 28 38·0	Radcliffe 1890, 3,766.
8	14 28 11·50	96 24 40·2	Lalande 26,549, Lamont 1,715.
9	14 23 12·48	96 26 0·1	Greenwich 1880, 2,243, Stone 7,891, Radcliffe 1890, 3 751.

Star.	R.A.	N.P.D.	Authority.
			㉒ *Calliope.*
	h m s	° ′ ″	
1	0 31 30·74	108 22 7·2	Six filar-micrometer Comps. with β Ceti, 1896 Oct. 16.
2	0 26 50·60	108 47 42·0	Arg.-Oeltzen 245–6, Radcliffe 1893, 101.
3	0 27 21·18	108 41 0·4	Arg.-Oeltzen 248–9.
			(61) *Danaë.*
1	22 9 0·13	105 36 54·6	Yarnall$_3$ 10,026, Radcliffe 1890, 5,980.
2	22 1 57·24	104 59 49·6	Lalande 43,108–9, Lamont 1,488, Arg.-Oeltzen 21,904, Yarnall$_3$ 9,957, Radcliffe 1890, 5,949.
3	21 58 50·15	104 57 0·4	Lalande 43,009, Lamont 1,486.
			(80) *Sappho.*
1	1 47 27·59	75 38 1·0	Yarnall$_3$ 900.
2	1 45 40·04	75 45 36·1	Yarnall$_3$ 884.
			(92) *Undina.*
1	0 44 55·01	101 12 16·1	Radcliffe 1860, 91, Yarnall$_3$ 436, Greenwich 1864, 99, Quetelet 332, Arg. Gen. Cat. 757, Stone 328, Radcliffe 1890, 168.
			(140) *Siwa.*
1	19 52 24·12	112 31 49·6	Arg.-Oeltzen 20,116, Arg. Gen. Cat. 27,328.
2	19 53 24·27	112 29 33·9	Arg.-Oeltzen 20,131, Arg. Gen. Cat. 27,360, Radcliffe 1890, 5,344.
3	19 44 4·06	113 2 27·8	Arg.-Oeltzen 19,992–3, Arg. Gen. Cat. 27,150, Radcliffe 1890, 5,298.
4	19 50 27·75	112 59 20·4	Arg. Gen. Cat. 27,286.

Private Observatory, The Peninsula, Windsor, N.S. Wales:
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